



FIELD REPORT
NORTH BRONSON INDUSTRIAL AREA RI/FS

Site Set-Up, Well Installation and Soil Boring Program
(Work Plan Subtasks 4.4 and 4.5)

August 17, 1989

Introduction

The Remedial Investigation (RI) Well Installation Program for the North Bronson Industrial Area was performed from July 31 through August 9, 1989. This included the installation of 19 monitoring wells at specific locations across the Site. Soil samples were collected during the performance of soil borings. The well program was completed in fulfillment of Subtask 4.5 of the Project Work Plan (dated September, 1988). Groundwater samples will be collected from these and other wells at the Site in the near future (Subtask 4.7).

In addition to the installation of monitoring wells, three soil borings were performed on the property of Bronson Plating to help assess potential source areas. This sampling was performed as part of Subtask 4.4 - Waste Characterization. The locations of monitoring wells and soil borings indicated on Figure 1.

All soil samples collected during the field investigation were shipped to U.S. EPA Contract Laboratory Program (CLP) laboratories for analysis. Samples were shipped out daily, at the end of each work day, by overnight express.

Groundwater elevations were taken upon completion of the well installation program, on August 9, 1989. This information is presented in Table 1.

The following narratives discuss the well installation program activities which were performed at the Site from July 31 through August 9, 1989. The information is provided on the basis of the two tasks performed - soil

borings and well installation. The soil boring program was originally scheduled for performance during the first part of the field work, but had to be postponed due to lack of CLP lab space. As a result, well installation took place from August 2 through 9, 1989, with soil borings being performed within this same time period, on August 7 and 8.

While originally scheduled for a 15-day duration, the well installation program was completed within 10 days. Of the originally budgeted \$93,000 for this task, approximately \$75,000 has been expended.

Site Set-Up: July 31 and August 1, 1989

Initial Site set-up was coordinated on June 22, 1989 by Brady Boyce, Kathy Shirey, and Clifford Yantz. The first portion of the day was spent making sure the Site trailer was usable and that utilities (phone/electric) were connected. An inventory of supplies on-hand was taken. The remainder of the day was spent locating the decon pad on Branch County Road Commission property, inspecting the existing monitoring wells located adjacent to the old seepage lagoons and confirming that they were sound for use in the second round of groundwater sampling, and staking the location of monitoring wells MW01S, MW02S, MW03S, MW04S, MW05S,D, MW11S, and MW12S,D. These locations were altered from their proposed positions to limit access problems or crop damage, and make them more accessible to drilling and monitoring crews.

Field activities involving the drilling of soil borings and installation of monitoring wells began on July 31, 1989. Warzyn's Assistant Site Hydrogeologist, Clifford Yantz, arrived at the Site on July 31, coordinated the clearing of utilities with Miss Dig, and reviewed previously staked monitoring well locations. The complete field crew, including the following representatives, arrived at the Site early August 1 and the day was spent setting up Site facilities, reviewing project issues, and preparing for drilling activities.

- Damon Lee - Warzyn Engineering Inc. (Warzyn) Project Manager;
- Geoffrey Prior - Warzyn Site Hydrogeologist;
- Clifford Yantz - Warzyn Assistant Site Hydrogeologist;
- Brady Boyce - Michigan Department of Natural Resources (MDNR) Project Manager;
- Kathy Shirey - MDNR Site Geologist;
- Allen Esko - Engineers International, Inc. (EI) Chain-of-Custody Representative;
- Dave Ellis, Ron Ball, and Quinton Nowak - John Mathes & Associates, Inc. (Mathes) Drilling Representatives.

The activities of August 1 included collection and distribution of supplies, reconnaissance of well locations, and discussion of Site protocols (health and safety, drilling, well installation, etc.). A decontamination pad was constructed near the Site trailer, on the property of the Branch County Road Commission. This consisted of a 15 ft x 20 ft wooden frame covered with plastic sheeting, and a sump pump for collection of decon water.

Soil Boring Program: August 7 and 8, 1989

Three soil borings were performed at Bronson Plating on August 7-8, 1989. Drilling of borings was achieved using a D-50 drilling rig with 4 1/4-in. Hollow Stem Augers (HSA) and center plug. During soil boring the following protocols were followed:

- Sampling Protocols: 3-in. split-spoon sampling was conducted in each borehole according to ASTM D-1586 protocols. Split-spoons were taken continuously from 0 to 10 ft and a final split-spoon was taken at 15 ft. Split-spoons were brush-washed in a trisodium phosphate (TSP) solution and triple rinsed with distilled water between reuse. Split-spoons were also steam-cleaned along with the rig between boreholes. Samples were screened using a Photoionization Detector (HNU) and a Hydrogen Cyanide Monitox (HCN) meter.
- Sample Selection Protocol: Samples were selected for analysis using the following criteria:

- Headspace analysis - each sample was screened for VOCs using an HNu, following the procedure summarized in Appendix G of the QAPP. Samples that exhibited relatively high or otherwise anomalous readings were tentatively selected for analysis. (Headspace analysis was not performed on VOA samples.)
- Appearance - a visual appraisal was made. Samples which exhibited unusual or anomalous appearances were tentatively selected for analysis.
- Lithology - samples were sometimes selected based on lithology or stratigraphic position, to trace contamination along a specific horizon.
- Spatial distribution - with all other criteria being equal, samples were selected to provide good spatial distribution.
- Personal Protection/Decon Protocols: Drilling/sampling was conducted at Level D protection. Personal decon included boot wash and rinse, hand wash and rinse, with a pressurized sprayer assisting in the rinse procedure.
- Drilling Rig Decon Protocols: The drilling rig and any equipment used during drilling was washed off at the drilling Site with drilling water and then moved to the decontamination pad, where the rig and equipment was decontaminated using a steam cleaner. The collected decontamination water was drummed using the sump pump, and disposed on-site at the end of the field work, after screening with an HNu produced no readings over 5 ppm.

On August 7, 1989 (late afternoon), SB03 was bored. An old red brick drain pipe, apparently oriented in an east-west direction was drilled through from 6 ft to 7 ft. No soil samples at this location looked grossly contaminated, although there was a black residue on the bottom (inside) of the drain tile. This residue was sampled (SS03) and sent to the lab for analysis. HNu and HCN readings were zero. After sampling, the boring was grouted with cement and granular bentonite.

On August 8, 1989, SB-01 was bored. Fill material was present to about 9 ft below surface. Starting at 9.0, 9.3, and 9.5 ft, soils indicated the presence of 2-in. thick black stain "zones" with yellow markings. Contact with this material resulted in the rapid deterioration of outer protective gloves. Samples of these zones were sent to the lab for analysis. Natural

soils were observed from 9.5 ft to the end of the boring (16.5 ft). SB01 was grouted with cement.

SB02 was bored immediately after SB01. FILL existed at this location from 0 to 7 ft. An organic, grease-like, clayey MUCK or SLUDGE was present at 7-8.5 ft. Like the black zones in SB01, this zone had yellow staining and caused glove deterioration. From 8.5 to 10 ft, natural soil (SAND) was present, as was also true at 15 ft.

Well Installation Program: August 2-9, 1989

Well installation was performed from August 2-6, and completed on August 9. Drilling for well installation was achieved using a D-50 drilling rig with 4 1/4-in. Hollow Stem Augers (HSA) and center plug. During the well installation program, the following protocols were followed:

- Sampling Protocols: Split-spoon sampling was conducted in each borehole according to ASTM D-1586 protocols. Split-spoons were taken at 5-ft intervals to 20 ft and at 10-ft intervals thereafter to 50 ft. Split-spoons were brush-washed in a TSP solution and triple rinsed with distilled water before reuse. Split-spoons were also steam cleaned along with the rig between boreholes. Samples were screened using an HNu and an HCN meter.
- Sample Selection Protocol: Same as Soil Boring Program.
- Personal Protection/Decon Protocols: Same as Soil Boring Program.
- Drilling Rig Decon Protocols: Same as Soil Boring Program.
- Well Construction Protocols:
 - Shallow Wells: A 2-in. well with 5-ft, #10 (0.01 in.) slot PVC screen, and 10-ft threaded PVC riser was installed to intersect the ground water table. The annular space was packed with a coarse sand pack to a height of at least 2 ft above the screen, and a 2-ft bentonite pellet seal was installed. Granular bentonite was placed to the ground surface. The well riser was cut-off to form a 2.5-ft stick up and a threaded cap was installed at the riser top. A locking protective casing with lock was placed over the well stick-up and pushed into place through the granular bentonite.

- Deep Wells: The same protocol for shallow wells was followed except that a bentonite slurry was placed above the bentonite pellets to within 5 ft of the ground surface, and granular bentonite was then added.
- Well Development Protocols: The wells were purged using the drilling rig suction pump and a 1-in. PVC hose. At least 10 well volumes were purged from each well, and all wells were purged until water appeared clear, with no odor and turbidity.

On August 2, 1989, MW01S was installed. The well was set at 13 ft. For general housekeeping purposes, cuttings were drummed and disposed at the Site trailer area. No HNu readings were recorded during drilling or sampling, and no odor or discoloration was noted.

After decontamination, the rig was moved to MW13D, and drilling was performed to 27 ft, where CLAY (CL) was encountered. HNu and HCN readings were zero throughout drilling and sampling, no odor or discoloration was noted. Therefore, cuttings were disposed of at the well location. The well was set at 25 ft. Eight ft of granular bentonite and natural cave-in sands were placed on top of the coarse sand pack, due to some problems with cave-in sands. Development of the well proceeded as per protocol, with 60 gallons being purged. HNu readings of purged water was zero, therefore the water was not contained.

On August 3, 1989, drilling of MW13S was performed to 14 ft. The well was set at 11 ft following general shallow well construction protocols. The well was developed per protocol with a total of 20 gallons being purged, and the cuttings were disposed of at the well location. Two bumper posts were installed later (8/7/89) around MW13S/D.

MW07D was bored next to a total depth of 14 ft, where CLAY (CL) was located. The well was set at 13 ft and constructed per shallow well construction protocols. Because this well intersected both the clay and the water table, it was decided it would be redesignated MW07S. HNu and HCN readings were zero throughout drilling, with no odor or discoloration noted, therefore cuttings and purged water were disposed of at the well location.

Drilling of MW08S was performed next. A silt till confining layer was encountered at 17 ft, and a coarse to fine SAND (SP) seam at 20 ft. Drilling was continued to evaluate the thickness of the sand seam. Drilling continued to 31 ft where CLAY (CL) was encountered. Samples were then taken as per protocol at 22 ft and 30 ft. Then well was set at 27 ft, constructed per deep well construction protocols, and developed per protocol (60 gallons purged). HNu and HCN readings were zero with no odor or discoloration, therefore cuttings and purge water were disposed of at the well location. MW08S was redesignated MW08D.

On August 4, 1989, MW10D was bored and sampled to 30 ft according to protocols. No sample recovery was obtained at 30 ft because of blow-up problems. The decision to drill another 5 ft and sample again was made because clay was not encountered yet. At 35 ft, blow-up problems worsened, with 5 ft of blow-up in augers. An attempt to flush the augers with clean water failed, as did clean water rotary drilling and bentonite mud rotary drilling. After a break for lunch, the augers were quickly cleared due to the tightening of the sand around them, eliminating the blow-up problem, and drilling continued to 50 ft following normal protocols. The sample collected at 50 ft (SS-08) displayed the contact between the SAND layer (SP) and CLAY (CL). The well was set at 49 ft and constructed following deep well construction protocols. HNu and HCN readings were zero throughout drilling with no odor or discoloration noted, and purge water (100 gallons) was therefore not contained. For housekeeping reasons, cuttings were drummed and disposed of at the site trailer area.

MW10S was bored approximately 8 ft from MW10D and set at a depth of 12 ft. Thirty-five (35) gallons of water was purged from the well during development.

On August 5, 1989, MW05D was bored to 50 ft. A Shelby tube was pushed 3-5 in. at 50 ft, with no sample being retrieved. The end of the tube was bent inward slightly, possibly indicating gravel at this depth. SS-07 was

collected at this depth, and 10 in. of coarse to fine SAND (SP) was recovered. The well was set at 46 ft according to deep well protocols. An 8 ft thick natural cave-in/granular bentonite seal was placed above the sand pack because of cave-in problems. One hundred (100) gallons were purged from the well during development and because HNu and HCN readings were zero with no odor or discoloration noted, cuttings and purge water were disposed at the well location.

MW05S was drilled to 15 ft, adjacent to MW05D. MW05S was set at 12 ft using shallow well construction protocols and the well was developed. MW04S was next bored and sampled by protocols. The well was set at 11 ft, following construction and development protocols. Cuttings and purged water were disposed at the well location. HNu and HCN readings were zero throughout drilling with no odor or discoloration noted.

On August 6, 1989, five (5) shallow wells were installed following standard drilling, sampling, shallow well construction, and development protocols. MW03S was set at 13 ft. MW14S was set at 12 ft, but while installing the protective casing the well was pushed 0.7 ft from 12.1 ft to 12.8 ft. MW08S was blind drilled, set at 11 ft, and was pushed 0.5 ft during protective casing installation. MW09S was set at 11 ft. MW01S was also developed on August 6, 1989, and a bumper post was set to keep trucks, etc. from damaging the well.

On August 7, 1989, MW12D was installed. Approximately 3,000 sq ft of corn was damaged while accessing this location. This had been negotiated with the owner by MDNR prior to site access. At this location, the soil from about 0 to 3 ft had a diesel fuel odor, and the leaves of trees were curled and discolored.

CLAY (CL) was encountered at 26 ft at MW12D. A Shelby tube was pushed from 26 to 28 ft, with 12 in. recovery of a gray clay. The well was set at 25 ft and constructed per protocol. The rig was moved immediately west of MW12D

and MW12S was bored and installed at 11 ft. Two (2) bumper posts were installed next to the MW12 wells to protect them from tractor movements.

Subsequent to the installation of MW12S/D, at the end of the day, bumper posts were placed at MW13D,S.

Drilling of MW06D began in the afternoon of August 8, 1989. CLAY (CL) was encountered at 13 ft. A Shelby tube was pushed from 13 to 15 ft with 12-in. recovery. The well was set at 12 ft, but while setting the pellet seal, the well was lifted out of place over 2 ft. To correct the problem, the well was pulled, and the hole was redrilled through the pellets and sand pack, to 2 ft below the end of previous boring. To remove any pellets that might have been left in the borehole, augers were spun in place until clear. The well was then relocated at 13 ft. MW06D was redesignated MW06S because it intersected the groundwater table and the clay.

A total of approximately 8,500 sq ft of corn and beans were damaged while accessing MW06S. This had been previously coordinated with the owner by MDNR. On leaving the well site, the rig ran over an irrigation well pipe (hydrant) at the entrance to the access path, and bent the pipe. MDNR discussed this with the owner and approved repair of the hydrant. The drilling subcontractor agreed to cover the cost for these repairs.

On August 9, 1989, MW11D was installed. CLAY (CL) was encountered during the first 5 ft, and drilling continued to a depth of 15 ft. The augers were advanced to 17 ft and a Shelby tube pushed from 17 to 19 ft. A 24-in. recovery was obtained, indicating CLAY (CL) at this depth. The well was set within the clay layer to monitor water within this layer and provide field tested hydraulic conductivity information in what appears to be the same clay encountered in the other wells. This K-value will help support any data arrived at in the lab from the K-testing of the Shelby tubes. MW11D was redesignated MW11S because it was a shallow well.

Upon completion of the well installation program, groundwater levels were monitored at all newly installed monitoring wells. This information is provided on Table 1. The remainder of the day was devoted to sample packing and delivery for shipping, and site clean up.

Warzyn, EI, and Mathes personnel departed the work Site at about 5:00 p.m. on August 9, 1989.

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